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Some cavernicolous and epigean cockroaches with six new species, and a discussion of the Nocticolidae (Dictyoptera: Blattaria)

by

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With 8 figures

ABSTRACT

Four new cave dwelling cockroaches, namely, *Nocticola australiensis* (Queensland), *Ischnoptera peckorum* (Galápagos Islands), *Symploce strinatii* (Sarawak), *Neostylopyga jambusanensis* (Sarawak), as well as two epigean species, *Nocticola babindaensis* (Queensland), and *Lobopterella princisi* (Thailand) are described. Undetermined *Nocticola* spp. are recorded from caves in Sarawak, and Ngergheu Island, Micronesia, and an epigean species of *Chorisonaura* was collected on Isla Santa Cruz, Galápagos; both are the first generic records for their respective islands. *Typhloblatta* Chopard and *Typhloblattodes* Chopard are transferred from the Blattellidae to the Nocticolidae. The Nocticolidae is placed in the Blaberoidea (rather than Blattoidea), between the Polyphagidae and Blattellidae. *Neostylopyga semoni* (Krauss) is transferred to *Duchailluia* Rehn. *Distylopyga* Bey-Bienko is synonymized with *Duchailluia*.

INTRODUCTION AND MATERIAL

This paper deals with material borrowed from or is now housed in the following institutions:

(ANIC) Australian National Insect Collection, CSIRO, Canberra, ACT, Australia; Dr. D. Rentz and Mr. J. Balderson.

(ANSP) Academy of Natural Sciences of Philadelphia; Mr. D. Azuma.

(BMNH) British Museum (Natural History), London, England; Mrs. Judith Marshall.

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(MHNG) Natural History Museum, Geneva, Switzerland; Dr. V. Aellen.

(UQIC) University of Queensland Insect Collection; Miss M. A. Schneider.

(QMBA) Queensland Museum, Brisbane, Australia; Dr. G. B. Monteith.

Specimens of new species originally were preserved in alcohol then either mounted on pins, or cleared and mounted on slides (some *Nocticola*). Slides also were prepared of male and female genitalia of some of the pinned specimens.

NOCTICOLIDAE: DIAGNOSIS AND GENERA

Diagnosis. Very small, delicate, whitish or pale yellowish. Eyes well developed, variably reduced, or absent, ocelli present or absent. Males may be fully winged, in which case both front and hind wings are similar, membranous, hyaline, minutely pubescent (often especially along the veins), veins few and essentially straight, costal veins, and distinct cross veins usually absent, anal regions greatly reduced; when at rest, fully developed wings lie flat across the abdomen and do not cross one another. Male tegmina may be normal in length, or reduced, with hind wings variably reduced or absent, or both tegmina and hind wings are reduced. Except for the female of *Spelaeoblatta gestroi* which has small lobiform tegmina and no hind wings, females are apterous (however, see *Cardacus himalayensis*, below). Male abdomen unspecialized or with a glandular modification on the fourth abdominal tergum. Male genitalia with complex phallomeres, hook on left side. Supraanal plate symmetrical. Styles present or absent, if the former often very small and difficult to see. Anteroventral margin of front femur with 1 or more large proximal spines followed by a row of piliform setae, terminating in 1 or more large terminal spines (= Type B), or with a row of piliform setae only, terminating in 1 or more large spines (= Type C); a numeral is used after the B or C, to denote the number of large terminal spines (e.g. Type B₁, B₂... etc.); arolia and pulvilli absent; tarsal claws very small, simple (however, under very high magnification, some appear to have microscopic teeth, at least in one species), symmetrical.

The few observations that have been made on living nocticolids emphasize their uniqueness. *Cardacopsis shelfordi* does not look like a cockroach. It runs and sits like an ant with legs held high, and flies quickly like a moth or embiopteran. At rest the wings lie horizontally on the abdomen, do not cross distally, but diverge as in flies (KARNY 1924: 19). *Nocticola uenoi uenoi* is found among gravel on banks of a subterranean stream, where bat guano occurs. Adults run quickly and hide under stones when disturbed. Because of their coloration and habits, they look like trechine beetles (ASAHINA 1974: 145).

Genera. The genera and species belonging to the Nocticolidae are shown in Table 1. Most are cavernicolous, 2 are termitophilous, several are epigeal, and at least 1 is found in or outside of caves. PRINCIS (1966: 604) listed 5 genera in this family and I am here adding *Typhloblatta* and *Typhloblattodes*.

Separation of the nocticolid genera is difficult, and the validity of some are questionable. CHOPARD (1945, 1966) could not distinguish between *Nocticola* and *Alluaudellina* and believed the two eventually would prove to be synonyms.

CHOPARD (1921: 512) described *Spelaeoblatta(?) caeca*, based on an immature male taken in a cave in Assam. Later, without additional specimens, he (1924: 92) made this nymph the type species of *Typhloblatta*, stating that it could not be a *Spelaeoblatta*, did not belong in the Blattinae, and the Type B front femur placed it in the Pseudomopinae

[Blattellidae]; PRINCIS (1969: 997) listed the genus in the Blattellidae. CHOPARD's description of *caeca* is very complete and excellently illustrated. It is clearly a species of *Nocticola* or *Cardacus*; the latter may prove to be a synonym of the former. If *caeca* proves to be a *Nocticola* (when the adult is discovered), it would be a homonym of *Nocticola caeca* Bolívar.

TABLE 1

Genera, species, distribution, and habitats of Nocticolidae

Genera and Species	Geographical locality	Habitat	Reference
<i>Nocticola</i> Bolívar			BOLÍVAR (1892)
<i>simoni</i> Bolívar	Philippines	cavernicolous	BOLÍVAR (1892)
<i>caeca</i> Bolívar	Philippines	cavernicolous	BOLÍVAR (1892)
<i>bolivari</i> Chopard	Ethiopia	cavernicolous	CHOPARD (1950)
<i>leleupi</i> Chopard	Transvaal	cavernicolous	CHOPARD (1966)
<i>decaryi</i> Chopard	Madagascar	cavernicolous	CHOPARD (1945)
<i>remyi</i> Chopard	Madagascar	cavernicolous	CHOPARD (1950)
<i>termitophila</i> Silvestri	North Vietnam	termitophilous	SILVESTRI (1946)
<i>sinensis</i> Silvestri	China	termitophilous	SILVESTRI (1946; 1947)
<i>uenoi kikaiensis</i> Asahina	Ryukyu Islands	cavernicolous	ASAHINA (1974)
<i>uenoi miyakoensis</i> Asahina	Ryukyu Islands	cavernicolous	ASAHINA (1974)
<i>uenoi uenoi</i> Asahina	Ryukyu Islands	cavernicolous	ASAHINA (1974)
<i>australiensis</i> Roth	Queensland	cavernicolous	this paper
<i>babindaensis</i> Roth	Queensland	epigean	this paper
sp.	Sarawak	cavernicolous	this paper
sp.	Micronesia	cavernicolous	this paper
<i>Alluaudellina</i> Chopard (= <i>Alluaudella</i> Shelford)			CHOPARD (1932)
<i>cavernicola</i> (Shelford)	Kenya, Tanganyika, Angola	cavernicolous and epigean	SHELFORD (1910a)
<i>himalayensis</i> (Gravely)	India	epigean	GRAVELY (1910; 1920)
<i>Cardacus</i> Strand (= <i>Cardax</i> Shelford)			STRAND (1928)
<i>willeyi</i> (Shelford)	Sri Lanka	epigean	SHELFORD (1908)
<i>Cardacopsis</i> Karny <i>shelfordi</i> Karny	Java	epigean	KARNY (1924) KARNY (1924)
<i>Spelaoblatta</i> Bolívar <i>gestroi</i> Bolívar	Burma	cavernicolous	BOLÍVAR (1897) BOLÍVAR (1897)
<i>Typhloblatta</i> Chopard <i>caeca</i> Chopard	Assam	cavernicolous	CHOPARD (1924) CHOPARD (1921)
<i>Typhloblattodes</i> Chopard <i>madecassus</i> Chopard	Madagascar	cavernicolous	CHOPARD (1945) CHOPARD (1945)

The genus *Typhloblattodes* was diagnosed by CHOPARD (1945: 152) as follows: "Show many characters in common with *Typhloblatta* from Assam, leg armature, antennae, form of palps, form of supraanal and subgenital plates; on the contrary, the cerci and legs are much shorter, and the eyes, although small, are present". The type species, *T. madecassus*, taken in a cave in Madagascar, was also based on a nymph and was collected with *Nocticola decareyi* (which was described from an adult male and female, but no nymphs). To base a genus on a nymph is bad enough, but to separate it from a closely related genus which was also based on a nymph, is incomprehensible. PRINCIS (1969: 997) listed *Typhloblattodes* in the Blattellidae.

The male of *Alluaudellina himalayensis* has well developed tegmina and wings, and normal eyes (GRAVELY 1920). The female has reduced eyes and tegmina, and vestigial wings, but according to GRAVELY (1920) it has styles. No adult female cockroaches have styles which are restricted to male nymphs and adults, and often to very young female nymphs (older female nymphs do not have them). If the above "female" has styles, it is probably a male and may be a variant of *himalayensis*. If it is a female it is the only nocticolid of that sex with distinctly veined membranous tegmina, and the only female cockroach with styles.

GRAVELY (1910: 311) compared the wings of *Cardacus willeyi* with *Alluaudellina himalayensis* and concluded that wing venation "... can hardly be considered of generic importance.", between these genera. He also stated that these two genera may be distinguished by the absence of ocelli and exposure of the vertex in *Alluaudellina*, whereas *Cardacus* has ocelli and its vertex is covered by the pronotum. KARNY (1924) believed that wing venation was of considerable importance in the Nocticolidae, and in his key (p. 18) separated *Alluaudellina*, *Cardacopsis*, and *Cardacus* (to which he transferred *Alluaudellina himalayensis*) by the degree of eye development, front wing venation, and presence or absence of ocelli. He did not include *Nocticola* in his key.

Alluaudellina cavernicola is the most thoroughly studied species in the family. CHOPARD (1932) found that its eyes and wings may vary from well developed to variably reduced. Different species of *Nocticola* show various degrees of wing and eye development which makes these features of questionable value in generic diagnoses.

RELATIONSHIP OF NOCTICOLIDAE TO OTHER FAMILIES

SHELFORD (1908: 161) found it difficult to determine the affinities of *Cardacus* (= *Cardax*), and he could not relate it closely to any known genus. He assigned it to a section which included the polyphagids, *Latindia*, *Paralattindia*, and *Homopteroidea* (PRINCIS's Polyphagoidea and MCKITTRICK's Polyphagidae). Later, SHELFORD (1910a: 116) included *Alluaudellina* (= *Alluaudella*) in the same group as *Cardacus*. KARNY (1924: 12) considered *Cardacopsis* to be a "Corydiine" (a polyphagid). BOLÍVAR (1892: 33) placed *Nocticola* in the Blattidae and this has been accepted by a number of workers, among them, REHN (1951: 3), CHOPARD (1932: 494), and BEY-BIENKO (1950: 57). PRINCIS (1966: 602) considered the nocticolids a family in the Blattoidea (near Blattidae), but he suggested, without reasons, that they should be moved to the Polyphagoidea. MACKERRAS (1967: 42) listed *Spelaoblatta* and *Nocticola* in the Blattidae with a query.

The reason for including these genera with blattids rather than polyphagids, which are widely separated groups in McKittrick's classification, is the structure of the female's subgenital plate. ASAHINA (1974: 147) found that when the ovipositor valves of *Nocticola*

are expanded, they closely resemble the broad subgenital plate of a blattellid female. "However, this lobe can be folded within the subgenital plate as soft folds. In this condition it cannot be seen from outside and is alike [sic] that of the ovipositor valves usual for a blattid. I have checked the same part for some blattids and found that if the valves are expanded by pressing, that part is not essentially different from that of *Nocticola* females. Because of this reason, Nocticolidae may be included in the suborder Blattodea."

Regarding the diagnostic value of a valvular vs simple female subgenital plate, HEBARD (1929: 5) stated that "Though such differentiation has been used to distinguish the subfamily Blattinae, it was not realized until recently that genera having a valvular subgenital plate occurred in other subfamilies to which were closely related genera having that plate unspecialized." As examples of this, females of *Anaplecta* and some polyphagids have valvular subgenital plates. MCKITTRICK (1964: 58) placed *Anaplecta* in Blattellidae: Anaplectinae and stated that their female genitalia were of considerable phylogenetic interest. "The seventh sternum [subgenital plate] is bilobed terminally as in *Hypercompsa fieberi* [Polyphagidae] and Blattidae."

SILVESTRI (1946) reared *Nocticola termitophila* from 2 eggs that were found in a termite nest. These eggs were not enclosed in an ootheca and SILVESTRI suggested that originally they were in an ootheca that was damaged by termites, or they were abnormally oviposited. The ootheca of *Alluaudellina cavernicola* is transparent and parchmentlike, contains about 5 eggs, and has a slightly elevated and weakly denticulated keel (CHOPARD 1932: 489, figs 26, 27). It is unlike any ootheca in the Blattidae (Blattinae, Polyzosteriinae, and Lamproblattinae) (ROTH 1968a). The keels of polyphagid ootheca vary considerably in complexity. Some species have nonserrated keels and few or no respiratory tubules (ROTH 1968a), but none closely resemble *A. cavernicola*. The egg case of *cavernicola* appears to be closest to that of *Attaphila fungicola* (Fig. 21 in ROTH 1971) whose oothecal wall is thin and transparent, the keel is simply a raised ridge with no distinct teeth, and there are about 1-3 eggs. *Attaphila* used to be considered a polyphagid, but MCKITTRICK (in ROTH 1968b) placed it in the Blattellidae.

The shapes and arrangement of the male genital phallomeres of Polyphagidae and Blattidae show some similarities (MCKITTRICK 1964). However, the left phallomere of *Nocticola* (Figs 2A, 3E) strongly resemble those of certain polyphagids (see Figs 110, 111, in MCKITTRICK 1964; Figs 3, 5, 8, in MACKERRAS 1968) and to a lesser extent *Anaplecta* (Fig. 112, in MCKITTRICK 1964).

Based on the above comparisons, I place the Nocticolidae between the Polyphagidae and Blattellidae (in MCKITTRICK's scheme). Because of their uniqueness I prefer to treat the group as a family rather than subfamily.

CHOPARD (1966: 308) believed that some species of *Nocticola* are so similar that the only justification for considering them distinct is their great geographical separation. It is probable that differences in male genitalia occur in similar appearing, but widely separated species in the genus. Based on the presence or absence of a male tergal gland, species of *Nocticola* (Table 1) can be placed in two groups as follows:

simoni-species-group. Male abdominal terga unspecialized. Species: *babindaensis*; *bolivari*; *caeca*; *decaryi*; *leleupi*; *remyi*; *simoni*; *sinensis*; *termitophila*.

uenoi-species-group. Male fourth abdominal tergum specialized. Species: *australiensis*; *uenoi kikaiensis*; *uenoi miyakoensis*; *uenoi-uenoi*.

Known males of other nocticolid genera do not have tergal glands.

Species of *Nocticola*, *Spelaeoblatta*, and *Alluaudellina* occur in regions where one finds species of cavernicolous *Trechodes* beetles (JEANNEL 1943: 147). CHOPARD (1932: 495) suggested that the Nocticolidae originated before the tertiary, and ASAHINA (1974: 145) believed that *Nocticola uenoi* and its subspecies originated after the Pleistocene, on the "relatively young islands" of the Ryukyus.

RECORDS AND DESCRIPTIONS OF SPECIES

Nocticola australiensis n. sp. (Figs 1A-1F, 2A-2C) (Nocticolidae)

Holotype, ♂, QUEENSLAND: Donna Cave, Chillagoe, 5.VI.1985 (F. G. Howarth and F. D. Stone) (QMBA).

Paratypes, QUEENSLAND: The following were collected by members of the Explorers Club in the Chillagoe Caves: Donna Cave, CH2, 258, 1♂ (entire insect on slide 40), 19.VII.1982; Trezkinn Cave, CH14, 1♀ (entire insect on slide 44), 5 nymphs (all on slide 45), 23.VII.1982. The following were collected by F. G. Howarth and F. D. Stone, in Donna Cave: 2♂, 4.VII.1984, 1♀, 5.VI.1985, 2♀ (1 with genitalia slide 59), 1 nymph, 3/5.VI.1985 (QMBA).

Male. Vertex of head exposed; eyes reduced to a few ommatidia narrowly grouped near antennal sockets (Fig. 1B; eye pigment is distinct in the alcoholic specimen but is lost in KOH treatment, although ommatidia are discernable under high power after clearing); ocelli absent; maxillary palps long and slender (Fig. 1C).

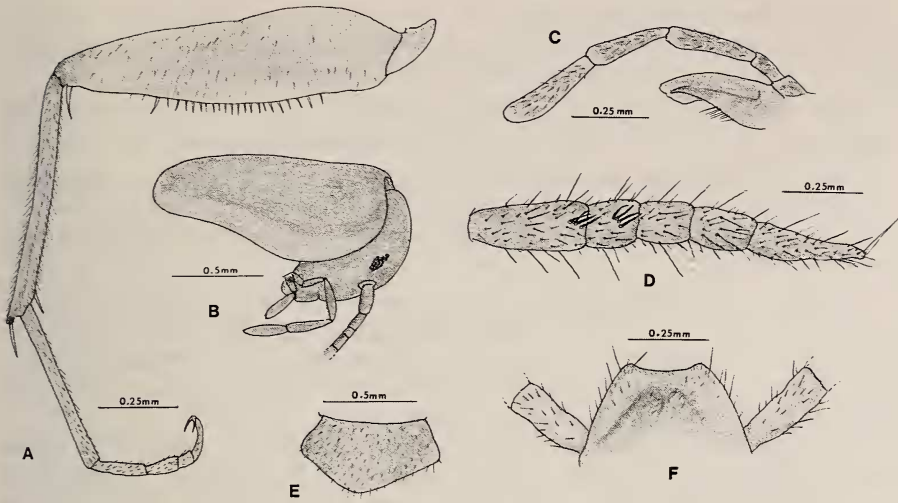
Pronotum about as wide as long (Fig. 2B).

Tegmina reduced in length reaching to about hind margin of fourth abdominal tergum; veins reduced in number, these covered with minute, recumbent setae which are sparse or absent in other areas (Fig. 2B). Hind wings absent; lateral portions of metanotum pubescent, somewhat produced, suggesting a wing surface, but this region not separated from metanotum (Fig. 2B).

Legs long and slender. Anteroventral margin of front femur with row of short piliform setae more or less similar in size, absent from small distal region, 1 large distal spine (= Type C₁) (Fig. 1A). Ventral margins of mid and hind femurs with some long slender setae; hind metatarsus distinctly longer than other tarsomeres combined; tarsal claws small, simple; pulvilli and arolia absent.

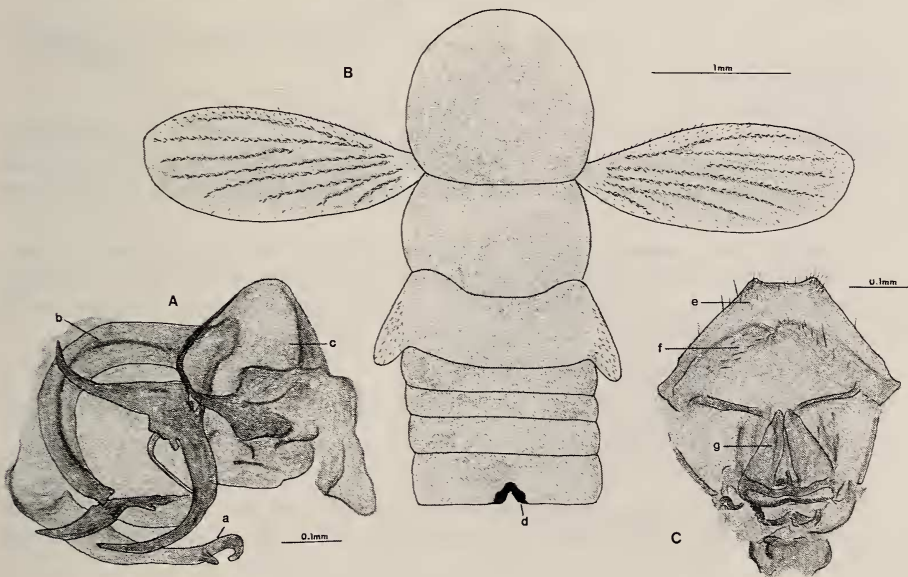
Fourth abdominal tergum with darkly pigmented, non setose, medial specialization along hind margin (Fig. 2B), in alcoholic or cleared slide preparation, specialization is very pronounced, but in pinned specimen (after being preserved in alcohol), the dark pigmented structure becomes poorly defined. Supraanal plate subtrapezoidal, hind margin widely, shallowly concave, right and left paraprocts similar, weakly pigmented simple plates without any processes (Fig. 1F). Subgenital plate convex, hind margin curved, entire; styles absent (Fig. 1E). Cerci long, slender, with slender setae but without group of large dark spines on proximal 2 segments (see ♀). Genitalia with hook phallomere on left side, other phallomeres complex (Fig. 2A).

Coloration very pale, almost colorless. The only dark areas are modification on T4, sclerotization at base of mandibles, and few small ommatidia.



FIGS 1A-1F.

Nocticola australiensis n. sp., paratypes: A, front leg ♂; B, head and pronotum ♂; C, maxillary palp ♂; D, cercus ♀; E, subgenital plate ♂; F, supraanal plate ♂ (ventral).



FIGS 2A-2C.

Nocticola australiensis n. sp., paratypes: A, genitalia (dorsal) ♂; B, thorax, tegmina, and abdominal terga one to four ♂; C, genitalia (dorsal) ♀. a, hooklike left phallomere; b, left phallomere; c, right phallomere; d, tergal gland on fourth segment; e, supraanal plate; f, paraproct; g, ovipositor valve.

Female. Eyes consisting of about 10 small black dots. Completely apterous. Supraanal plate similar to ♂ (Fig. 2C). Genitalia as in Fig. 2C. Cerci with a contiguous group of a few dark, large setae on 2 proximal segments (Fig. 1D).

Measurements (mm) (♀ in parentheses). Length, 4.0-5.0 (4.2-5.4); pronotum length × width, 1.3-1.5 × 1.3-1.5 (1.3-1.5 × 1.2-1.8); tegmen length × width 1.9-2.1 × 0.7-0.9.

Nymph. Nymphs have few small, black, ommatidial spots (lost in KOH treatment), which occur even in the smallest (2 mm) specimen; other specimens ranged from 3.0-4.5 mm long). The entire guts of 5 nymphs (cleared in KOH) were filled with what appeared to be soil.

Comments. The presence of a gland on the male's fourth abdominal tergum is an unusual position among cockroaches (ROTH 1969). It does not occur in all species of *Nocticola*, and was first described in *N. uenoi* and its subspecies, from caves in the Ryukyu Islands (ASAHINA 1974). From ASAHINA's drawings, the shape of the gland on T4 in his subspecies differs from that found in *australiensis*.

A small group of dark setae is found on the proximal cercal segments of the female *australiensis* (Fig. 1D). It does not occur in all species of *Nocticola* but has been noted on the second and third cercal segments of *N. termitophila* (see Fig. 10 in SILVESTRI 1946).

***Nocticola babindaensis* n. sp. (Figs 3A-3E)**

Holotype, ♂, QUEENSLAND: Babinda, light trap in rain forest, entire insect on slides 39a and 39b, 12.IV.1971 (D. A. DUCKHOUSE) (ANIC).

Male. Vertex of head exposed; eyes normal, very large, ocelli absent (Fig. 3D).

Pronotum wider than long.

Tegmina and wings completely developed, pubescent (Fig. 3A).

Anteroventral margin of front femur with row of piliform setae and 1 terminal spine (Type C₁); pulvilli and arolia absent, tarsal claws essentially simple (under very high power of a compound microscope, some of the claws have minute teeth which are not visible under the dissecting microscope).

Abdominal terga unspecialized. Hind margin of supraanal plate shallowly concave (Fig. 3B). Subgenital plate with hind margin oblique, asymmetrically concave, corners rounded, partially pubescent (Fig. 3C). Styles absent. Genitalia as in Fig. 3E; hook on left side, subapical incision absent; phallomeres weakly sclerotized.

Very pale, practically colorless.

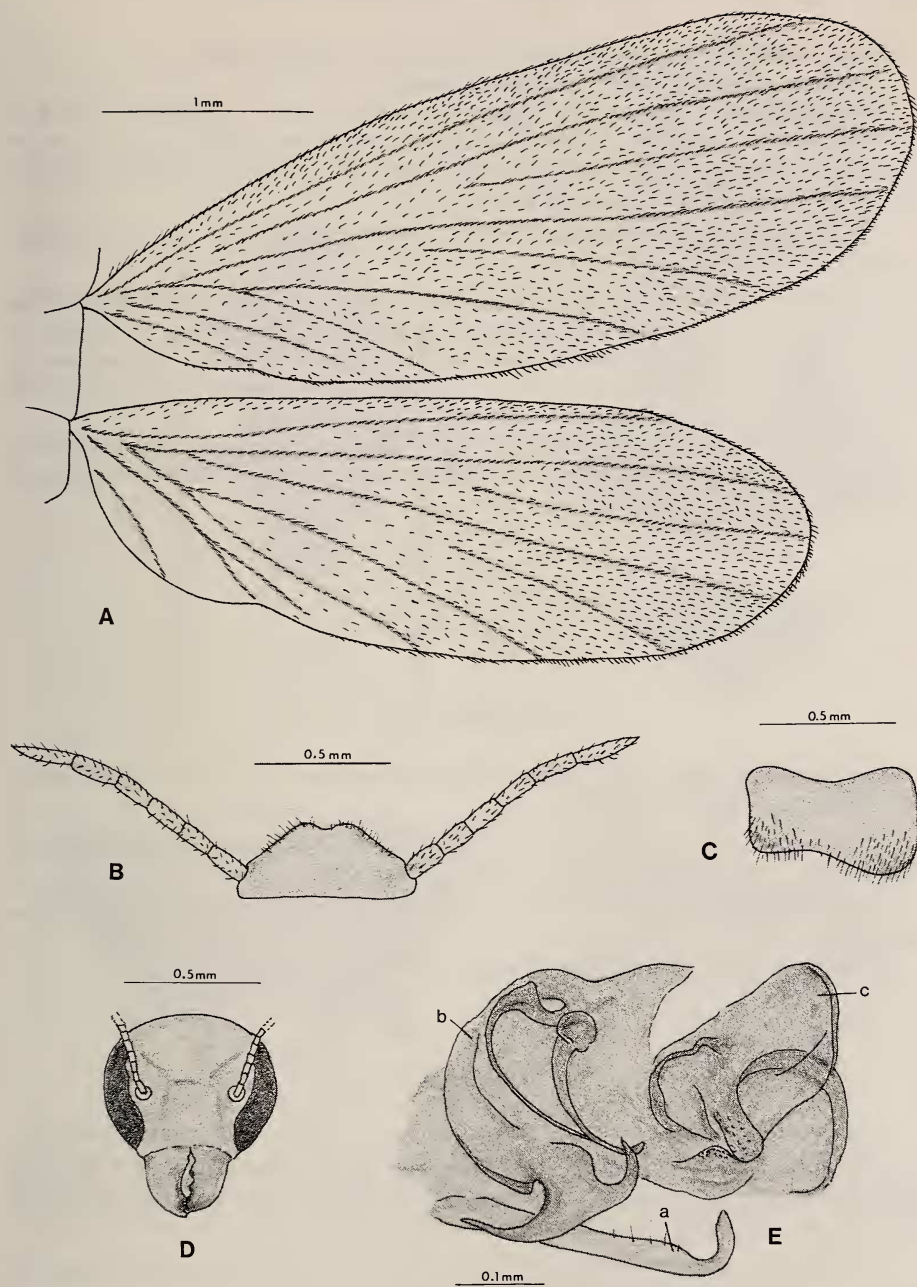
Measurements (mm). Length, 3.2; pronotum length × width, 0.7 × 1.1; tegmen length, 4.0; hind wing length, 3.5.

Female. Unknown.

Comments. This epigean species differs from *australiensis* by the absence of a male tergal gland, eyes and flight organs fully developed, and shape of supraanal plate and genitalia.

***Nocticola* sp.**

QUEENSLAND: Crater Nat. Pk., via Atherton, 1♂ (on slide 19), 1♀ (on slide 18), 9.VIII.1968 (B. Cantrell) (UQIC).



FIGS 3A-3E.

Nocticola babindaensis n. sp., holotype ♂: A, right tegmen and hind wing; B, supraanal plate and cerci; C, subgenital plate (dorsal); D, head (cleared specimen, labrum not shown, mandibles exposed); E, genitalia (dorsal). a, hooklike left phallomere; b, left phallomere; c, right phallomere.

Male. Eyes a narrow, longitudinal line of dark ommatidial spots.

Tegmina reduced in length, hind wings absent.

Fourth abdominal tergum with a large transverse depression completely filled with dark recumbent setae (under the dissecting microscope, the area is dark; the setae can be seen under high power of a compound microscope, after clearing in KOH). Supraanal plate shallowly concavely excavated. Styles absent.

Measurements (mm). Length, 3.3; pronotum length \times width, 1.0 \times 1.2; tegmen length, 1.7.

Comments. This is probably a new species. Unfortunately, there was only 1 male which was badly fragmented during slide preparation. The tergal gland in this species differs strongly from that of *N. australiensis* (Fig. 2B) which has no setae associated with it. The large glandular area resembles the one found in subspecies of *N. uenoi* but no setae were mentioned in its description (ASAHINA 1974, Figs 1, 9, 18).

There are no caves in Crater National Park, where the specimens were collected, and as far as B. Cantrell could remember he found them under logs in a rain forest (Margaret Schneider, personal communication).

Nocticola sp.

QUEENSLAND: Niggle Cave, 2 miles east of Camooweal, 1 ♀, 3 nymphs (in alcohol), 11.XI.1969 (K. Williamson) (UQIC).

Female. Eyes represented by 3 minute dark dots arranged longitudinally. Supraanal plate trigonal, apex weakly indented. Completely apterous.

Nymph. Eyes as in adult ♀, or a narrow longitudinal streak of more numerous ommatidia.

Associated males are needed to determine if this is an undescribed species.

Nocticola spp.

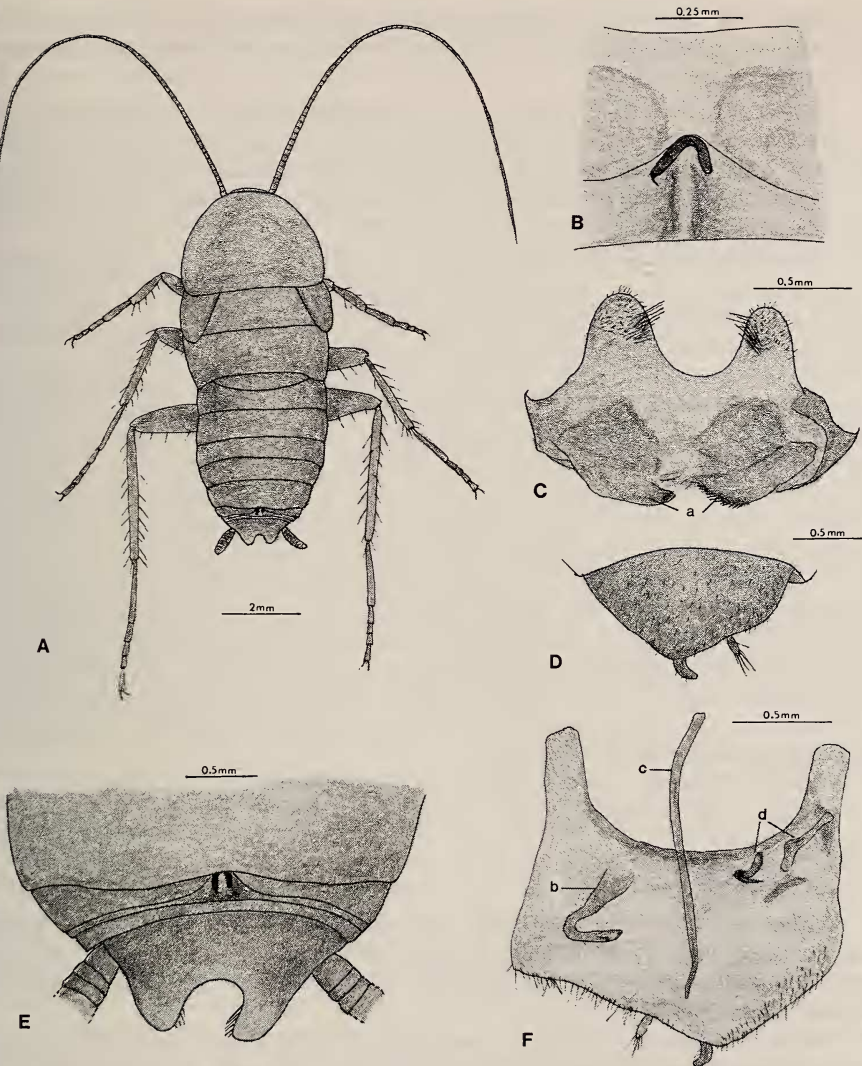
SARAWAK: Niang Cave, Ganung Jambusan, 1 ♀, XI.1980 (P. Chapman) (BMNH).

MICRONESIA: Chie Malk Cave, Ngergheu Island [north of Pelelieu Island and east of Ngemelis Island], Belau Islands [formerly Pelau], 1 ♀ (entire insect slide 259), 3.IV.1984 (R. J. Palmer) (BMNH).

Comments. The above 2 females from Sarawak and Micronesia are apterous and are the first *Nocticola* records for these islands.

PHILIPPINE ISLANDS: Montalban Cave, Prov. Rizal, Luzon, 1 nymph (on slide 1), 29.III.1983 (P. Strinati) (MHNG).

Comments. Two species of *Nocticola*, namely, *simoni* and *caeca*, have been described from caves on Luzon (BOLÍVAR 1892).



FIGS 4A-4F.

Ischnoptera peckorum n. sp., holotype ♂: A, habitus; B, medial regions of abdominal terga 7 and 8 showing specialization; C, supraanal plate and paraprocts (ventral); D, subgenital plate and styles (ventral); E, abdominal terga 6 to 10 [supraanal plate] (dorsal); F, subgenital plate and genitalia (dorsal). a, paraprocts; b, hooklike left phallomere; c, median phallomere; d, right phallomere.

***Ischnoptera peckorum* n. sp. (Figs 4A-4F)**
 (Blattellidae: Blattellinae)

Holotype, ♂ (terminalia slide 258), ECUADOR: Galápagos Islands, St. Cruz, 1 km east of Bellavista, 210 m, Bellavista Cave No. 2, meat and banana baits, 14.VII.1985 (Stewart and Jarmila Peck) (BMNH).

Etymology: The species is named after Stewart and Jarmila Peck, a husband and wife entomological team from Carleton University, Ottawa, Canada, who collected the unique type.

Male. Eyes absent (i.e., pigmented ommatidia are lacking), but the margins of the original eyes are clearly present; ocelli absent. Antennae filamentous, longer than body. Maxillary palps elongate, third and fourth segments about equal in length, fifth longer.

Tegmina reduced to narrow lateral pads, their apices reaching only slightly beyond hind margin of mesothorax; hind wings absent (Fig. 4A).

Anteroventral margin of front femur with 3 or 4 large spines near middle, followed by a row of piliform setae, terminating in 3 large distal spines (Type B₃), posteroventral margin essentially without spines; ventral margins of mid and hind femurs with numerous large spines; pulvilli and arolia absent, tarsal claws simple, symmetrical.

Abdominal tergum 1 (T1) unspecialized, tergum 7 narrow, largely hidden under tergum 6, hind margin medially invaginated, there bearing on its ventral surface a small darkly sclerotized specialization consisting of 2 diverging arms, the left one bearing a single spine at its apex (the spine on the right arm apparently was broken off, or the specimen is aberrant) (Figs 4B, 4E); eighth tergum with a rounded longitudinal medial elevation extending between the modification on T7. Supraanal plate symmetrical, lateral margins concave, hind margin with a broad, deep, U-shaped excavation, ventral surface with 2 groups of short and long setae on distal regions of arms of the U (Fig. 4C). Paraprocts a pair of large, weakly dissimilar plates, the right one with small distinct spines on one margin (Fig. 4C). Subgenital plate weakly asymmetrical, trigonal, styles weakly dissimilar, right one slightly larger arising at apex of plate, left one separated from it by about twice its length (Figs 4D, 4F). Genitalia with hooklike phallomere on left side, with a subapical incision, median phallomere a simple rod, apex unmodified, sclerites of right phallomere greatly reduced (Fig. 4F).

General coloration, chestnut brown.

Measurements (mm). Length, 9.8; pronotum length × width, 2.3 × 3.9; tegmen length × width, 1.5 × 0.9.

Female. Unknown.

Comments. The only significant difference in "generic" characters between *peckorum* and other species of *Ischnoptera* is the absence of arolia, pulvilli, eyes, hind wings, and greatly reduced tegmina, structures that often are lost or reduced in truly cavernicolous species.

During climbing, the tarsal claws function on rough surfaces whereas the arolia and pulvilli are important in climbing smooth surfaces (ROTH & WILLIS 1952; ARNOLD 1974). MACKERRAS (1967) stated that pulvilli and arolia are so frequently lost in cavernicolous cockroaches that, in some way, they must be disadvantageous. CHRISTIANSEN (1965) found that the more elongated tarsal claws in cave collembola reduced adhesion by the surface tension of water films in moist caves, and this facilitated locomotion on wet surfaces.

PRINCIS (1954) used the absence of pulvilli and/or arolia as the principal generic character for separating some Australian genera (e.g., *Franwalkeria* Princis, *Shawella* Princis, and *Paratemnopteryx* Saussure), some of whose members live in caves. Whatever the reason for their loss, pulvilli and arolia are adaptive characters (ARNOLD 1974), although their loss is not restricted to cave habitats, and they are insufficiently stable to be used as the principal diagnostic generic features. I have studied an undescribed

Australian species of *Paratemnopteryx* whose members of a population from one cave have pulvilli, and those from another lack them; all other male characters, i.e., supraanal plate, subgenital plate and styles, genital phallomeres, tergal gland on the first abdominal segment, are similar in both populations.

The tergal modification on the seventh and eighth segments of *I. peckorum* is typical of virtually all species of *Ischnoptera* in which males have been described (see Figs. 47-53 in ROTH 1969). *Ischnoptera* is a large genus with 66 species listed by PRINCIS (1969: 736-750). Most of them are found in South America, a few in Central America, Mexico, Cuba, and only two occur in the United States. *Ischnoptera peckorum* probably evolved from a species that originated from South America.

The distinctive supraanal plate of *peckorum* differs from other species in the genus, but coincidentally resembles that of *Trogloblattella chapmani* Roth from a Sarawak cave (ROTH 1980). There are a number of species of *Ischnoptera* in which the supraanal plate is partly unsclerotized and membranous. HEBARD's drawings (1916, pl. XVI) show that the extent of the loss of pigmentation (sclerotization) and presumably hardness of the supraanal plate varies between species. *Ischnoptera morio* Burmeister, type species of the genus (from Venezuela and Columbia) is of special interest. HEBARD (1916: 341) described its supraanal plate as follows: "... narrow lateral and proximal portions chitinous [i.e., sclerotized]; remaining large mesal and distal portion occupied by an ample, soft, whitish integument, its margins joining the chitinous portions forming a large part of a perfect circle, its distal margin truncate; lateral chitinous portions not enlarged but rather broadly rounded distad, their apices supplied with a number of bristles." It is not difficult to imagine that the complete loss of the membranous, unsclerotized area of the supraanal plate of *morio* (Pl. XVII, fig. 4, in HEBARD 1916) would result in a plate similar to that of *peckorum*.

No truly cavernicolous *Ischnoptera* have been named. However, a nymph (REDELLE & MITCHELL 1971), and adult females (FISK 1977) of *Ischnoptera* have been found in Mexican caves. The females reported by FISK showed no modifications for a cave habitat (Fisk, personal communication).

Nine species of cockroaches have been reported from the Galápagos Islands (HEBARD 1920; LINSLEY & USINGER 1966). Only *Anisopygia snodgrassi* (McNeill) is endemic; the others are adventives and most are domiciliary or tend to live near human habitation (HEBARD 1920). *Ischnoptera peckorum* undoubtedly is endemic in the Galápagos Islands. Epigeal *Ischnoptera*, which might be ancestors of the cave species, have not been found on the Galápagos, but should be sought in additional field work.

The Pecks also collected several specimens of an unidentified species of *Chorisoneura* in the highlands of Isla Santa Cruz, the first record of this genus for the archipelago.

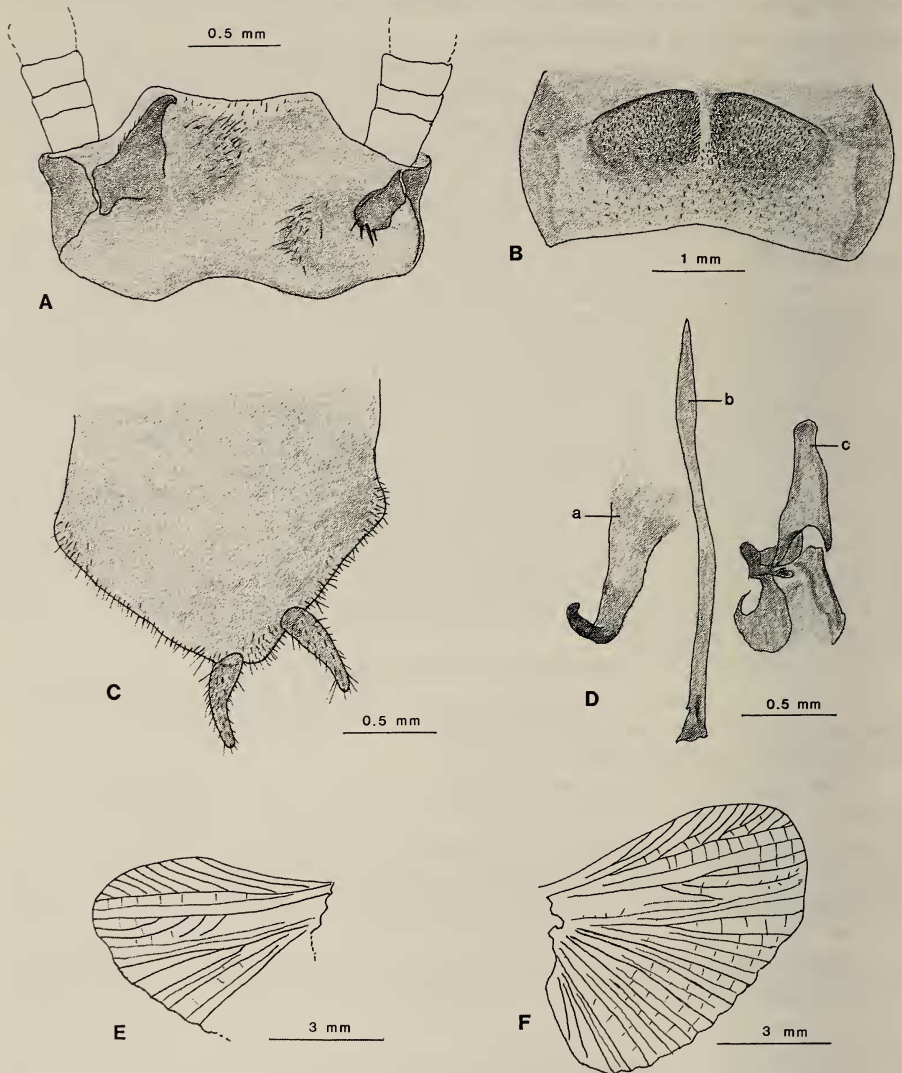
***Symploce strinatii* n. sp. (Figs 5A-5F)**

(Blattellidae: Blattellinae)

Holotype, ♂, SARAWAK: Niah Cave, Malaysia, 10.IV.1984 (Pierre Strinati) (MHNG).

Paratypes, SARAWAK: same data as holotype, 2♂ (one with terminalia slide 2), 3♀ (MHNG).

Male. Eyes and ocellar spots well developed. Interocular distance about same as interocellar space.



FIGS 5A-5F.

Symploce strinatii n. sp., paratypes: A, supraanal plate and paraprocts (ventral) ♂; B, seventh abdominal tergum, ♂; C, subgenital plate and styles (ventral); D, genital phallomeres (dorsal) ♂; E, hind wing ♂; F, hind wing ♀. a, hooklike left phallomere; b, medial phallomere; c, right phallomere.

Tegmina and wings reduced in length, reaching to about sixth tergum. Cubitus vein of hind wing with 2 complete and 2 incomplete branches, apical triangle absent (Fig. 5E).

Anteroventral margin of front femur with a row of small spines that decrease in length distad (some of the more distal spines resemble piliform setae), terminating in 3 large distal spines (Type A₃); pulvilli subobsolete or absent on some tarsomeres, arolia very small, tarsal claws simple, symmetrical.

First abdominal tergum unspecialized, the seventh tergum with a pair of huge depressions, their surfaces covered with fine setae, the fossae themselves mostly hidden by the sixth tergum (Fig. 5B). Supraanal plate subtrapezoidal, hind margin weakly concave (Fig. 5A). Paraprocts dissimilar, right one small with small terminal spines, left one larger, more robust, spinelike (Fig. 5A). Subgenital plate convex, trigonal, styles similar, cylindrical, elongate, tapering (Fig. 5C). Genital phallomeres as in Fig. 5D.

Head brownish black to black, labrum and base of clypeus light brown. Pronotum blackish brown, disk with some reddish brown areas, but not with a distinct pattern. Tegmina, abdomen, cerci, and legs, light brown.

Female. Supraanal plate transverse, hind margin weakly indented. Tegmina and wings longer than in male, reaching to eighth tergum. Hind wing (Fig. 5F), with 1-2 complete and 2 incomplete branches. Pulvilli slightly more developed, and abdomen somewhat darker than in male.

Measurements (mm) (♀ in parentheses). Length, 12.5-14.0 (11.5-13.0); pronotum length × width, 3.3-3.5 × 4.8-4.9 (3.5-3.8 × 5.0-5.4); tegmen length, 7.1-7.4 (7.4-8.3).

Comments. *Symploce strinatii* may be restricted to a cave habitat. If it is, its well developed eyes, and only partial reduction of tegmina and wings, and partial loss of pulvilli, suggests that it has occupied caves relatively recently.

Symploce strinatii belongs to the *bicolorata*-species-group which includes 2 epigeal species, *S. bicolorata* Roth (Kalimantan; Sabah), and *S. ferruginea* Roth (Sabah; West Malaysia) (ROTH 1985a). The very dark head and pronotum, and much lighter tegmina, abdomen, and legs, are characteristic of all three species, and they have a similar habitus. The male *strinatii* can be separated from *bicolorata* and *ferruginea* by differences in shape of styles, supraanal and subgenital plates, paraprocts, genital phallomeres, and the absence of a gland on the first tergum.

One small undetermined polyphagid nymph was collected in Niah Cave, Sarawak, 10.IV.1984 (P. Strinati and C. Hug) (MHNG).

Lobopterella Princis (Blattellidae: Blattellinae)

Lobopterella Princis, 1957: 145. Type species, *Temnopteryx dimidiatipes* Bolívar.

Diagnosis. Both sexes with reduced tegmina that do not extend beyond T₃, hind wings vestigial. Male: seventh abdominal tergum with a pair of minute, nonsetose pits which may be hidden by overlapping T₆ [PRINCIS stated that the terga are unspecialized]. Subgenital plate strongly convex, asymmetrical, with setose styles and processes (may be difficult to distinguish between them) (Figs 6D, 6F). Anteroventral margin of front femur Type A₂ or A₃, pulvilli present on 4 proximal tarsomeres, tarsal claws simple, symmetrical, arolia present. Genitalia with hooklike phallomere on left side, median phallomere branched at about the middle (Fig. 6E).

Comments. The male's strongly asymmetrical subgenital plate, setose styles and processes, and the bifurcated median genital phallomere of *Lobopterella* are strongly reminiscent of males of *Parasymptoe* (ROTH 1985b), and suggest a close relationship between these two genera.

PRINCIS (1969: 856) listed two species of *Lobopterella*, namely *dimidiatipes*, and *pallipes* (from Sumba). The new species described below raises the number to three.

***Lobopterella princisi* n. sp. (Figs 6B-6F)**

Holotype. Male, THAILAND: Pak Thong Chai, Khorat, 23.XII.1966, (N. Kobayashi) (ANSP).

Paratype. THAILAND, same data as holotype, ♂ (terminalia slide 402) (ANSP).

Etymology. The species is dedicated to the late Karlis Princis for his contributions to cockroach taxonomy, and who determined the specimens as an undescribed *Lobopterella*.

Description. Male. Interocular width same as distance between antennal sockets.

Tegmina reduced in length reaching to about middle of T2, width normal (Fig. 6B); hind wings vestigial, narrow, lateral, reaching to metanotum.

Pronotum parabolic (Fig. 6B).

Seventh abdominal tergum with a pair of anteromedial round, non-setose depressions, hidden under posterior margin of T6. Supraanal plate trigonal, apex broadly rounded (Fig. 6B). Subgenital plate strongly convex, hind margin complex with setose lobes between styles (Fig. 6D), best seen in cleared, flattened preparation (Fig. 6F). Genital phallomeres as in Fig. 6E; hooklike phallomere on left side; median phallomere branched well anterior from the apex.

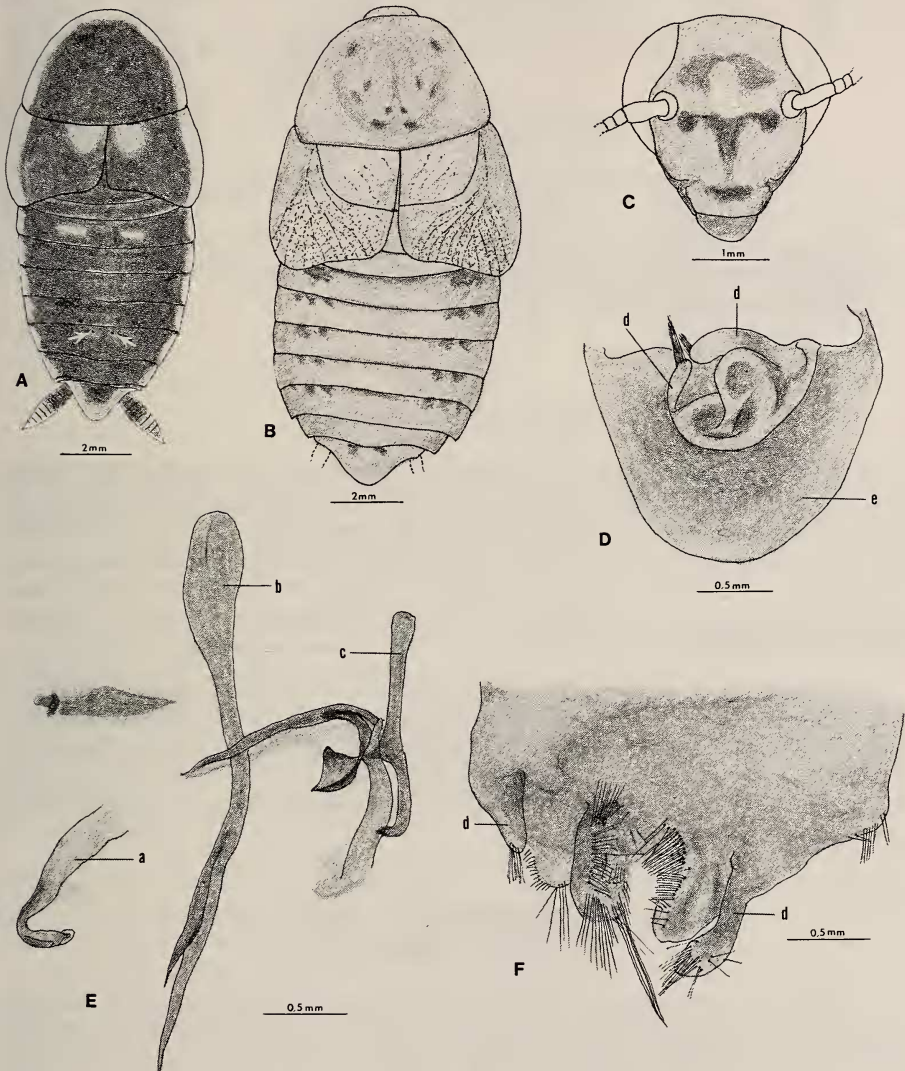
Front femur Type A₂, tarsal claws simple, symmetrical, pulvilli and arolia present.

Coloration: light brown. Head pale with dark brown maculae between eyes, antennal sockets; anterior half of clypeus, and labrum dark brown (Fig. 6C), maxillary palps pale, last segment with dark basal maculae. Pronotum light brown, disk slightly darker with symmetrical dark brown markings (Fig. 6B). Tegmina light brown. Abdominal terga light brown with dark anterolateral spots and medial bands, partly hidden under overlapping segments. Supraanal plate mostly pale, with a pair of anteromedial spots. Abdominal sterna pale with dark anterolateral spots. Front coxae with a dark, narrow, transverse, basal stripe; mid and hind coxae with dark spots. In paratype, prothoracic markings are more distinct, dark areas on abdominal terga are more extensive and medial dark zones extend to hind margins of some segments.

Measurements (mm). Length, 12.5-13.3; pronotum length × width, 3.6 × 5.3; tegmen length, 3.8-4.0.

Female. Unknown.

Comments. The habitus of *Lobopterella princisi* differs strongly from that of *L. dimidiatipes* (cp. Figs 6A and 6B), the other species in the genus whose male is known. However, basic characters such as specialization on T7, genital phallomeres, and complex subgenital plate and styles, are remarkably similar in both species. *Lobopterella pallipes* Princis, from East Sumba, is known only from the female (PRINCIS 1957: 146) it's color differs from the other 2 known species and is decidedly smaller [length, 7.6; pronotum length × width, 1.8 × 2.5; tegmen length, 2.0].



FIGS 6A-6F.

Lobopterella spp., males. A, *L. dimidiatipes* (Bolívar), habitus. B-F, *L. princisi* n. sp.: B-D, holotype, habitus, head, and subgenital plate (end view); E, F, paratype, genital phallomeres (dorsal), and distal end of subgenital plate (dorsal; flattened KOH treated specimen). a, hooklike left phallomere; b, median phallomere; c, right phallomere; d, styles; e, subgenital plate.

***Pycnoscelus striata* (Kirby)**
(Blaberidae: Pycnoscelinae)

SARAWAK: Niah Cave, Malaysia, 1♂, 4♀, 6 nymphs (P. Strinati and C. Hug), 10.IV.1984 (MHNG).

This species was reported earlier from Niah Great Cave (ROTH 1980).

***Pycnoscelus surinamensis* (Linn.)**

FIJI: Wailotua Cave, Wailotua, Viti Levu, 1♀ (P. Strinati and V. Aellen), 30.III.1977 (MHNG).

This parthenogenetic species is principally epigean but has been collected several times in caves (ROTH 1980; in this paper, *Pycnoscelus indicus* should be substituted for *P. surinamensis* in Figs 14 and 15).

***Gyna* spp.**

(Blaberidae: Perisphaeriinae)

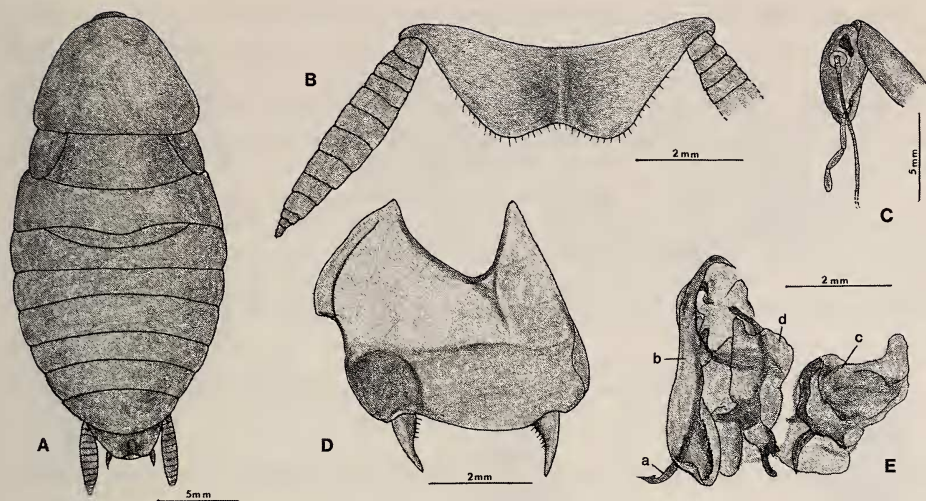
KENYA: Grotte de Similani, 10 km south of Mombasa, 1♂, 29.IX.1975 (P. Strinati and V. Aellen) (MHNG). The following were collected by P. Strinati and V. Aellen: Grotte de Similani, 10 km south of Mombasa, prélèvement de terre, 226 nymphs, 29.IX.1975; Grotte de Shimoni B, 70 km southwest of Mombasa, prélèvement de terre, 29 nymphs, 28.IX.1975; Grotte de Shimoni A, 2 nymphs, 28.IX.1975; Grotte à Coleura Leisure Diani Beach, 26 km south of Mombasa, prélèvement de terre, 14 nymphs, 29.IX.1975 (MHNG).

Comments. The only adult collected was very drab in color and its pronotum had very faint markings. All the nymphs were strikingly marked, and their dark pronotal disks were distinctly different from that of the adult, possibly indicating another species. Two species of *Gyna*, namely, *maculipennis* (Schaum) and *kazungulana* Giglio-Tos have been taken in African caves. The above adult showed no modifications characteristic of most true cavernicolous species.

***Neostylopyga jambusanensis* n. sp. (Figs 7A-7E)**
(Blattidae: Blattinae)

Holotype, ♂, SARAWAK: around Bau (southeast of Kuching), 1st Division, limestone hills (Gunungs), Gunung Jambusan, Niang Cave [limestone], pocketed muddy "stal." [= any carbonate deposit in a cave], floor of cave near swiftlet guano, high level, XI.1980 (Philip Chapman) (BMNH).

Paratypes, SARAWAK: The following were collected by Philip Chapman: same data as holotype, 1♀; Bau, New Upper Level Cave, Gunung Jambusan, attracted to rotten liver bait, pocketed mud floor, 1♂ (terminalia slide 249), 1♂ nymph, 26.XI.1980; Gunung Kapor, Fairy Cave, damp mud under rotted stal. [flowstone], DZ [= dark zone], 2 nymphs, 26.II.1980; Bau, Niang Cave, Gunung Jambusan, 9 nymphs, XI.1980 (BMNH).



FIGS 7A-7E.

Neostylopyga jambusanensis n. sp., males. A, holotype, habitus. B-E, paratypes from Upper Level Cave, Gunung Jambusan, Sarawak: B, supraanal plate (dorsal); C, head (lateral); D, subgenital plate and styles (dorsal); E, genital phallomeres (dorsal). a, hooklike left phallomere; b, left phallomere; c, right phallomere; d, ventral phallomere.

Etymology. The specific name is derived from Jambusan, the Malay name of the hill in which the cave containing the species is located.

Male. Eyes reduced to a small triangular group of ommatidia, ocelli absent (Fig. 7C).

Tegmina reduced to small lateral pads whose rounded apices reach only to hind margin of mesonotum; hind wings absent (in holotype, tegmina are completely separated from mesonotum; in paratype, basal part of sutural margin of tegmina is still an integral part of mesonotal surface) (Fig. 7A).

Anteroventral margin of front femur with row of large spines, those on distal half closer together, more numerous, and somewhat shorter than those on basal half, 3 large distal spines; ventral margins of mid and hind femurs with large spines; pulvilli apical but may be absent from metatarsi; tarsal claws very long, slender, simple; arolia absent.

Abdominal tergites unspecialized. Supraanal plate transverse, lateral margins oblique, hind margin broadly concave, fringed with setae (Fig. 7B). Subgenital plate essentially symmetrical, dorsal surface thickened on left side (this hidden by overlapping supraanal plate); styles similar, broad on basal half, some setae on inner margins, interstyler margin weakly convex (Fig. 7D). Genitalia as in Fig. 7E.

Coloration dark reddish brown. Clypeus yellow. Coxae yellowish brown.

Female. Subgenital plate valvular, otherwise habitus similar to male, including shape of supraanal plate.

Measurements (mm) (♀ in parentheses). Length, 28.0 (30.0); pronotum length × width, 7.5-8.4 × 10.0-10.1 (8.8 × 10.3); tegmen length × width, 4.6-4.7 × 2.4-2.7 (5.0 × 2.3).

Nymph. Resembles adult, including reduced eyes, but lacks tegmina. Lighter brown.

Comments. In typical *Neostylopyga*, small pulvilli are present on all four proximal tarsomeres, and the arolia are moderately large (HEBARD 1917). In *N. jambusanensis* the arolia, and the pulvilli from some of the tarsomeres, are absent. Loss of these adaptive characters often occur in cave dwelling cockroaches (see comments under *Ischnoptera peckorum*).

This appears to be the first record of a cavernicolous *Neostylopyga*. *N. jambusanensis* is a scavenger associated with swiftlet colonies. They do not live on the guano surface but occur in perpetually dark parts of caves, near burrows, under rocks, etc. It has not been taken outside of caves. (Chapman, personal communication). The greatly reduced eyes suggest that they probably are restricted to a cave habitat.

Duchailulia semoni (Krauss) n. comb. (Figs 8A-8E)
(Blattidae: Blattinae)

Stylopyga semoni Krauss, 1902: 751 (♂ ♀); SHELFORD 1910b: 14; HANITSCH 1915: 106; 1932: 74, fig. 16.

Blatta semoni (Krauss): KIRBY 1910: 564.

Neosteleopyga [sic] *semoni* (Krauss): CAUDELL 1927: 6.

Neostylopyga semoni (Krauss): HEBARD 1929: 83; BRUIJNING 1948: 113; PRINCIS 1953: 54; 1957: 152; ASAHINA 1976: 306.

Distylopyga semoni (Krauss): BEY-BIENKO 1965: 1640 [footnote]; PRINCIS 1966: 542; ASAHINA 1976: 307 [synonymized with *Neostylopyga semoni*]. New Combination.

Duchailulia sp.: COHEN & ROTH 1970: 1521, fig. 4; ROTH 1971: 127, figs 5, 6; ROTH & ALSOP 1978: 474, fig. 9.

THAILAND: 4♂, 1♀, 7 oothecae [mounted on card], reared from specimens collected in Pak Thong Chai, under litter around house, very damp habitat, 26.IV.1967 (Louis M. Roth) (ANSP).

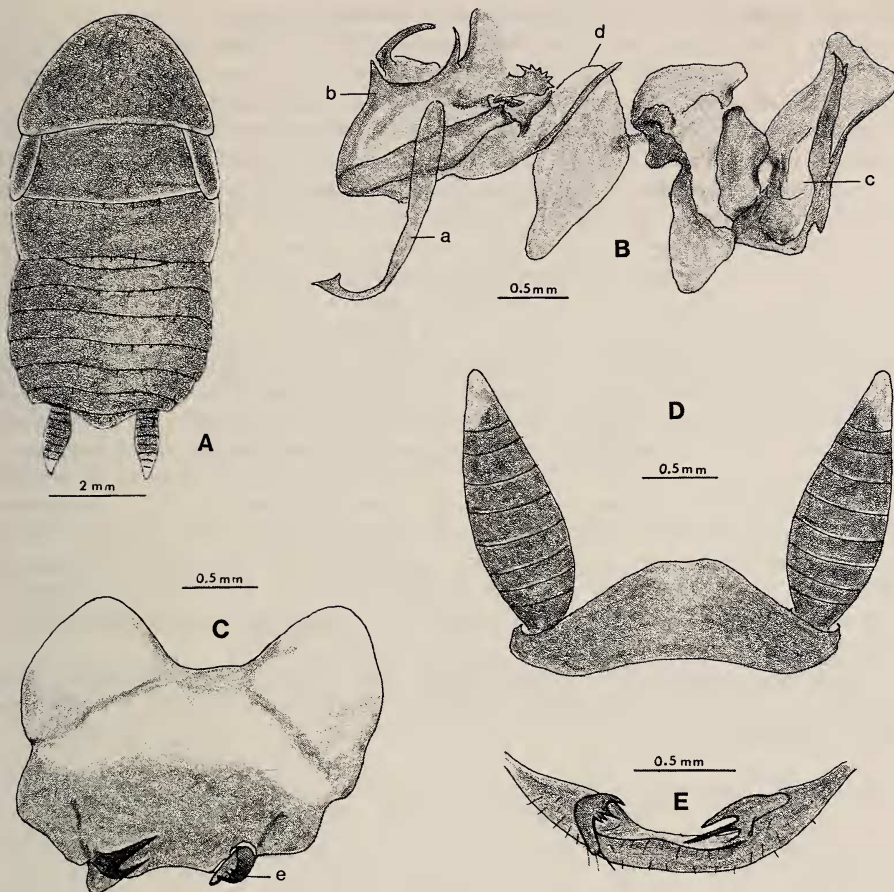
Male. Eyes wide apart, interocular space greater than distance between ocelliform spots; face with well spaced upright hairs.

Pro-, meso-, and metanotum with small fine upright hairs. Tegmina small lateral pads extending slightly beyond hind margin of mesonotum, with some short hairs; hind wings absent (Fig. 8A).

Anteroventral margin of front femur with row of large spines essentially equal in length and uniformly spaced, with 2 large apical spines (there may be a third smaller distal spine only slightly larger than last spines of row); apical pulvilli on proximal four tarsomeres, arolia small, tarsal claws symmetrical, simple.

Abdominal terga unspecialized, short hairs mainly along hind margins. Hind margin of seventh tergum weakly undulate, medial region convex. Eighth and ninth terga hidden. Supraanal plate transverse, trigonal, hind margin mesally with shallow concave excavation (Fig. 8D). Abdominal sterna with well spaced hairs. Subgenital plate weakly asymmetrical, lateral regions directed dorsad. Styles dissimilar, arising from grooves along inner margin of plate, short, bifurcated with small spinelike processes, interstylar margin concave (Figs 8C, 8E). Cerci somewhat flattened dorsally. Genitalia as in Fig. 8B.

Coloration shiny black or chestnut brown. Head black, clypeus and labrum brownish yellow, palps pale, last segment darker than preceding segments. Costal region of tegmina reddish, or entire tegmen ringed by a narrow reddish border. Tip of cerci with a pale spot. Legs reddish brown, tarsi lighter, ventral margins of femurs pale.



FIGS 8A-8E.

Duchailulia semoni (Krauss), ♂ from Pak Thong Chai, Thailand: A, habitus; B, genital phallomeres (dorsal); C, subgenital plate and styles (ventral); D, supraanal plate and cerci (dorsal); E, styles (end view). a, hooklike left phallomere; b, left phallomere; c, right phallomere; d, ventral phallomere; e, left style.

Female. Differs from male as follows: Larger. Hind margin of supraanal plate truncate or weakly concave medially. Subgenital plate valvular. Reddish edging may be absent from tegmina.

Measurements (mm) (♀ in parentheses). Length, 8.5-9.0 (12.0); pronotum length × width, 2.3-2.6 × 3.7-3.8 (3.3 × 4.3); tegmen length × width, 1.3-1.5 × 0.7-0.8 (2.1 × 1.0).

Comments. This species has been considered to be a *Neostylopyga* by most recent authors. However, BEY-BIENKO (1965: 1650) selected *semoni* as the type species of *Distylopyga*, and PRINCIS listed it under this genus. ASAHINA (1976: 307) disagreed and

kept it in *Neostylopyga*. He did note that its styles were "peculiar... curled claws". The specimens I have used here were determined by PRINCIS (personal communication, 24.I.1969) as a species of *Duchailluia*. They agree with ASAHINA's redescription of *semoni*, and REHN's (1933: 444) diagnosis of the genus *Duchailluia*.

REHN selected *Periplaneta anthracina* Gerst. as the type species of *Duchailluia*. He stated that it is more closely related to *Neostylopyga* than 3 other genera of Blattinae. One of the diagnostic characters distinguishing *Duchailluia* from *Neostylopyga* is the shape of the styles which in the latter are unbranched, and bifurcated in the former. PRINCIS (1966: 557) listed 8 species of *Duchailluia*, one with a query. All are from Africa and *D. semoni* is the only species in the genus outside of that continent. It has been recorded from Malakka, Sumatra, Java, Timor, Pulau Jarak, and the west coast of the Malay Peninsula. The present record is the first from Thailand.

From descriptions and illustrations of African species, the right and left styles are similar and symmetrical in all but *D. congoensis* Shelford. In this species the right style is forked, the inner limb of the fork being reduced to a small curved hook; in the left style, the branches are widely separated and there are some minute tubercles at the junction of the branches (SHELFORD 1911: 201). These styles strongly resemble those of *D. semoni*.

The ootheca of *D. semoni* is typical of the Blattinae (ROTH 1971, figs 5, 6; reported as *Duchailluia* sp. [13T], and the eggs contain about 65% water which is similar to that found in other genera and species of Blattidae (ROTH 1967). The diploid chromosome number for the species is 41 (♂) and 42 (♀) (COHEN & ROTH 1970; reported as *Duchailluia* n. sp.). The adults possess a sternal scent gland that opens midventrally between the sixth and seventh sterna (ROTH & ALSOP 1978, fig. 9).

Duchailluia semoni varies considerably in size (Table 2). The specimens from Thailand (see above measurements) are distinctly smaller than those from other areas shown in the table.

TABLE 2

Variation in size (in mm) of Duchailuia semoni from different geographical areas

Locality	Length	Pronotum	Tegmen Length	Authority
		Length × Width		
Java (Tjibodas) [Type specimens]	♂ 17.0-20.0	5.6 × 6.5-8.0	3.5-4.0	KRAUSS (1902)
	♀ 22.0	6.0-6.5 × 7.5-8.0	4.0	
Java	♂ 16.4-18.9	5.0-5.6 × 6.5-7.3	2.4-2.5	BRUIJNING (1948)
	♀ 17.7-19.9	5.4-6.1 × 6.8-8.2	2.3-3.1	
Sumatra (Si-Rambe)	♂ 15.0	—	—	HANITSCH (1932)
West Malaysia	♂ 13.0-16.0	—	—	ASAHINA (1976)
	♀ 18.0	—	—	

Periplaneta americana (Linn.)
(Blattidae: Blattinae)

NETHERLANDS ANTILLES: Curaçao, grot van Hato, 1 ♀, 4 nymphs, 9-11.II.1985 (P. Strinati and V. Aellen); Aruba, Huliba Cave, 2 nymphs, grot van Fontein, 2 nymphs, 12.II.1985 (P. Strinati and V. Aellen) (MHNG).

BERMUDA: Leamington Cave, 3 nymphs, 16.XII.1985 (P. Strinati) (MHNG).

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